SERVICE MANUAL

FISHER

FM-120L

LW/MW/FM
Stereo Tuner
(EUROPE)

Studio Standard by FISHER
LW/MW/FM STEREO TUNER FM-120L

The first name in high fidelity

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SPECIFICATIONS

FM Section

Tuning Range	87.5 – 108 MHz
DIN Sensitivity (75 ohms)	
(Mono)	1.5 μV
(Stereo)	35 μV
IHF Sensitivity (300 ohms)	
(Mono)	3.0 μV
(Stereo)	7.0 μV
Stereo Trigger Sensitivity	3.0 μV
Muting Threshold	8.0 μV
S/N Ratio (DIN)	
(Mono)	65 dB
(Stereo)	60 dB
Selectivity (DIN)	72 dB
Capture Ratio	1.0 dB
AM Suppression	60 dB
Spurious Rejection	75 dB
IF Rejection	80 dB
Image Rejection	50 dB
Sub-Carrier Suppression (19/38 kHz)	70/76 dB
THD (1 kHz)	
(Mono)	0.2 %
(Stereo)	0.5 %
Frequency Response (20 Hz – 15 kHz)	±1.0 dB
Channel Separation (1 kHz)	40 dB
Output Voltage	1 V

MW Section

Tuning Range	520 – 1610 kHz
Sensitivity	300 μV/m
S/N Ratio	55 dB
Image Rejection	40 dB
Selectivity (10 kHz)	40 dB
THD (30 % Mod.)	0.5 %
Spurious Rejection	60 dB
IF Rejection	40 dB

LW Section

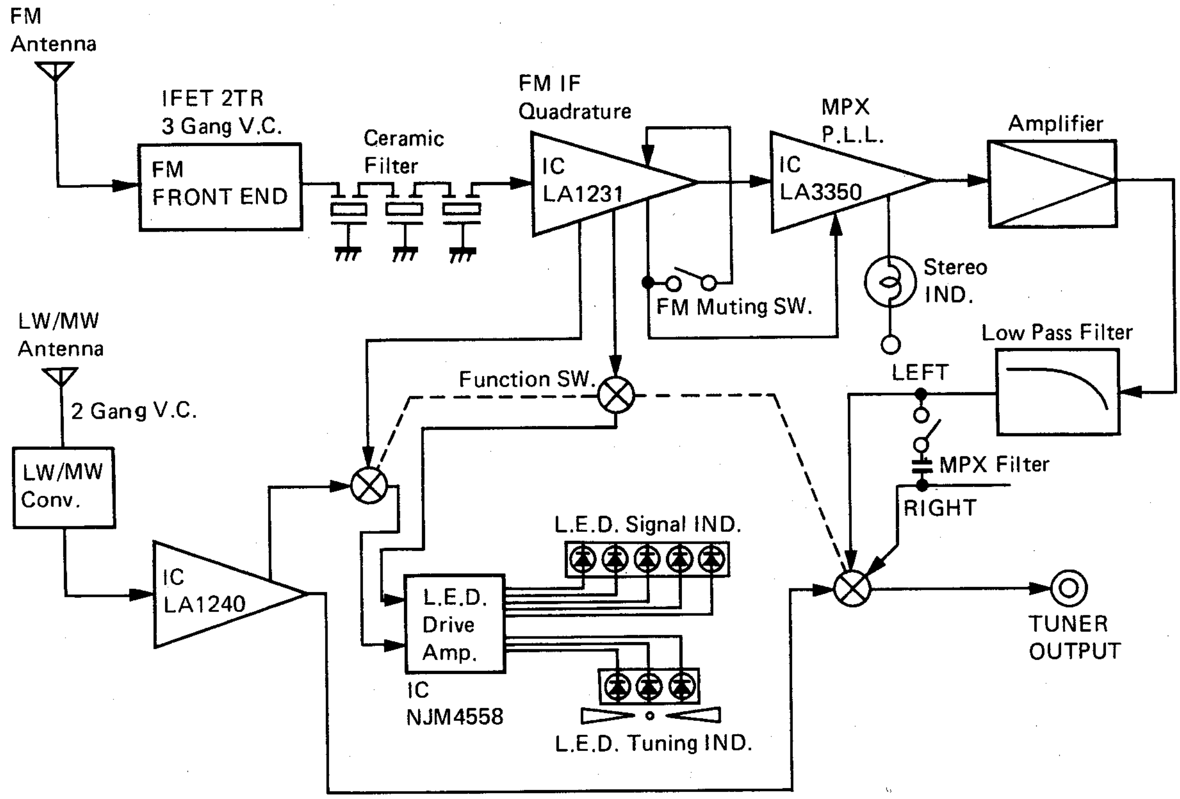
Tuning Range	145 – 355 kHz
Sensitivity	500 μV/m
S/N Ratio	55 dB
Image Rejection	40 dB
Selectivity (10 kHz)	40 dB
THD (30 % Mod.)	0.5 %
Spurious Rejection	60 dB
IF Rejection	40 dB

General

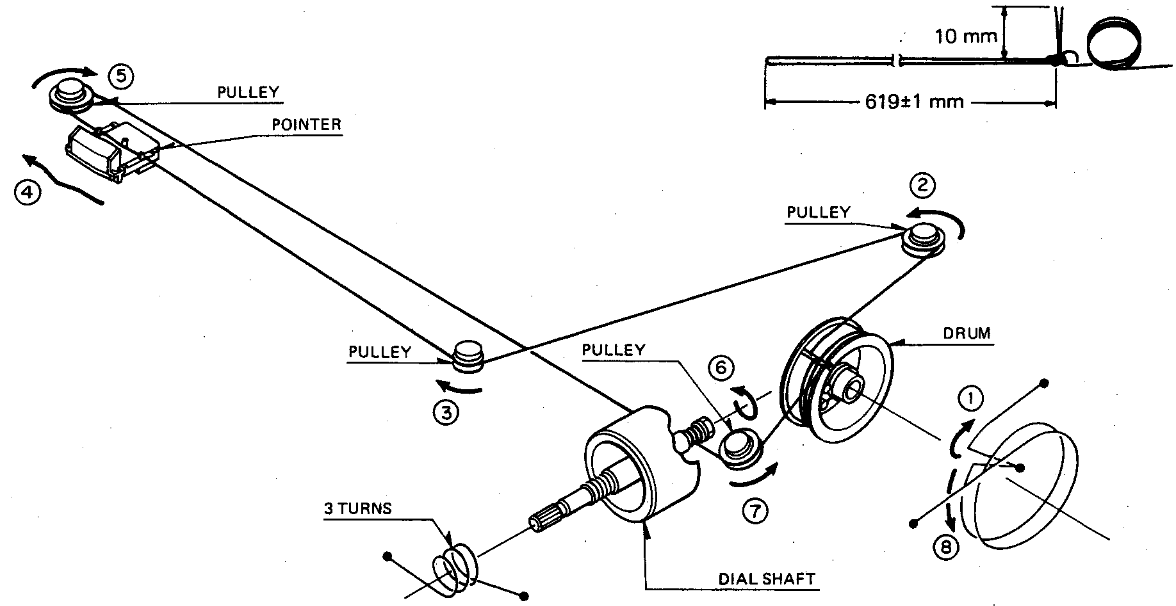
Power Requirements	AC: 110/220 V, 50 Hz
Power Consumption	16 W
Dimensions (W) x (D) x (H)	400 x 220 x 125 mm
Weight (approx.)	3.6 kg

—Specifications are subject to change without notice.—

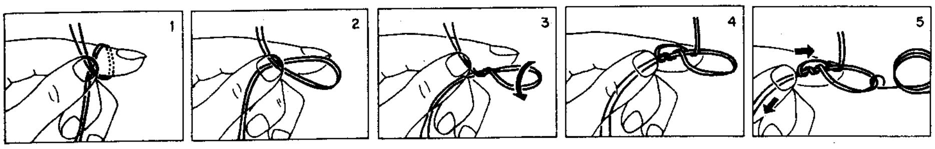
FUNCTIONAL BLOCK DIAGRAM


FM
Antenna
IFET 2TR
3 Gang V.C.
FM
FRONT END
Ceramic
Filter
FM IF
Quadrature
IC
LA1231
MPX
P.L.L.
IC
LA3350
Amplifier
Stereo
IND.
FM Muting SW.
Low Pass Filter
LEFT
MPX Filter
RIGHT
LW/MW
Antenna
2 Gang V.C.
LW/MW
Conv.
Function SW.
IC
LA1240
L.E.D. Signal IND.
L.E.D.
Drive
Amp.
IC
NJM4558
L.E.D. Tuning IND.
TUNER
OUTPUT

DIAL CORD STRINGING

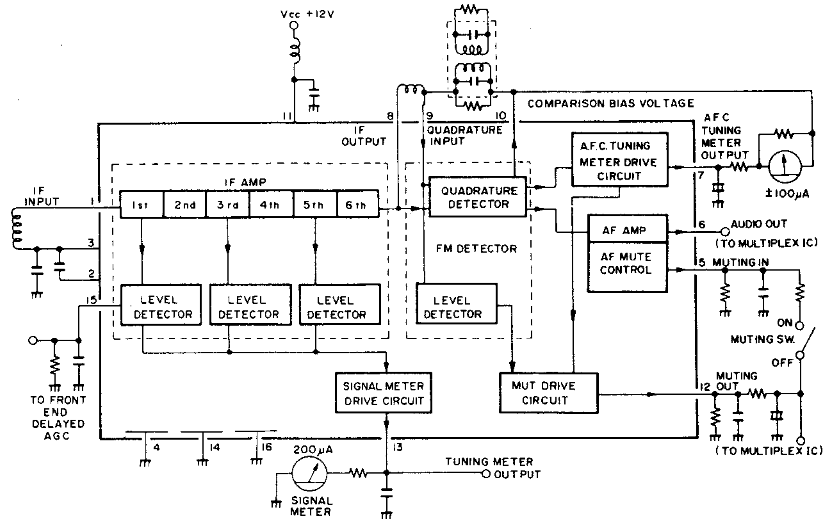

10 mm
619±1 mm
⑤
PULLEY
POINTER
④
②
PULLEY
DRUM
PULLEY
③
PULLEY
⑥
①
⑦
⑧
3 TURNS
DIAL SHAFT

CORD KNOTTING

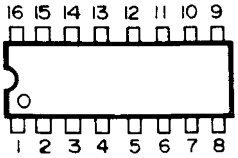


NOTE: Check to see that the dial cord is correctly strung by turning the dial.

FM IF IC LA1231 SIGNAL FLOW

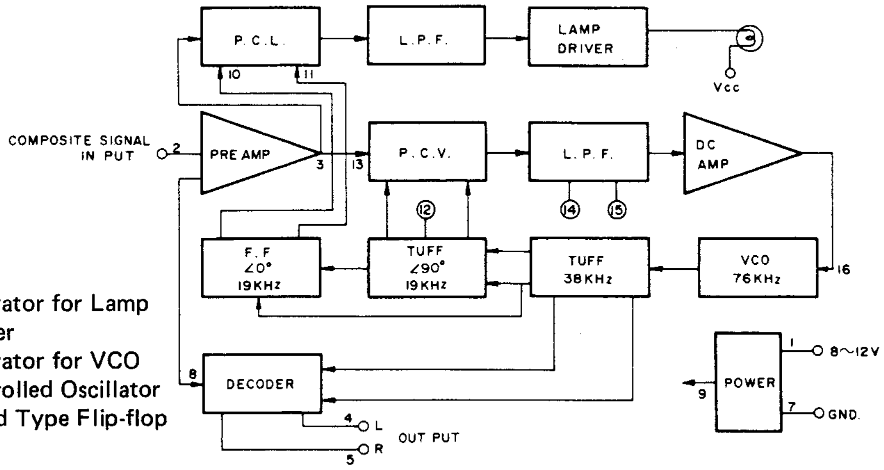

Vcc +12V
IF INPUT
IF OUTPUT
QUADRATURE INPUT
COMPARISON BIAS VOLTAGE
IF AMP
1st
2nd
3rd
4th
5th
6th
LEVEL DETECTOR
QUADRATURE DETECTOR
FM DETECTOR
A.F.C. TUNING METER DRIVE CIRCUIT
AFC TUNING METER OUTPUT
±100μA
AF AMP
AF MUTE CONTROL
AUDIO OUT (TO MULTIPLEX IC)
MUTING IN
ON
MUTING SW.
OFF
MUTING OUT
(TO MULTIPLEX IC)
SIGNAL METER DRIVE CIRCUIT
MUT DRIVE CIRCUIT
TO FRONT END DELAYED AGC
200μA
SIGNAL METER
TUNING METER OUTPUT

IC TOP VIEW

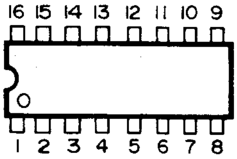

16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8

FM MPX IC LA3350 SIGNAL FLOW

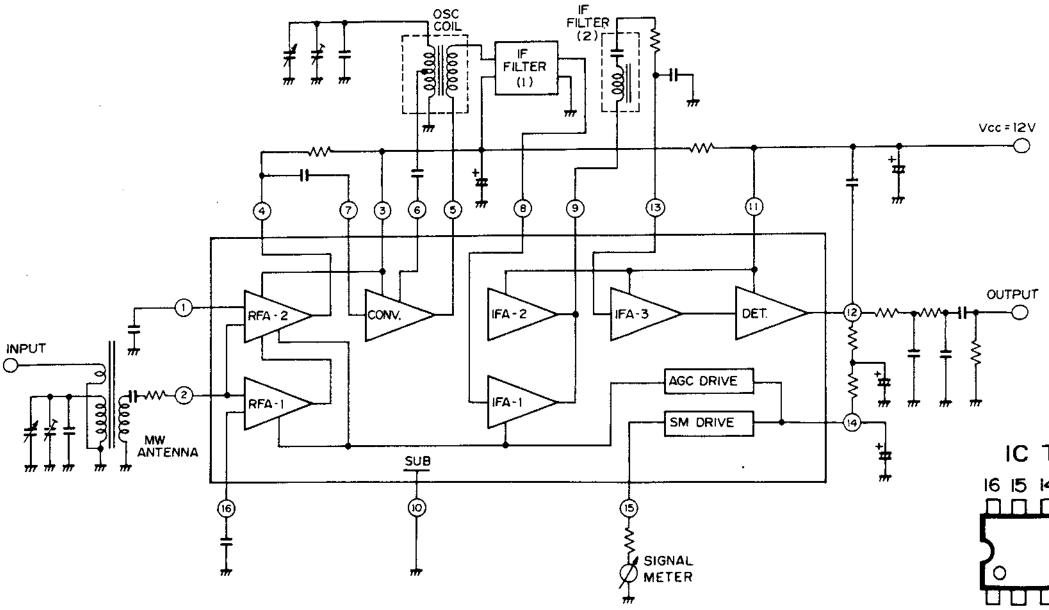
P. C. L. : Phase Comparator for Lamp
L. P. F. : Low Pass Filter
P. C. V. : Phase Comparator for VCO
V C O : Voltage Controlled Oscillator
TUFF : Direct coupled Type Flip-flop


P. C. L.
L. P. F.
LAMP DRIVER
Vcc
COMPOSITE SIGNAL IN PUT
PRE AMP
P. C. V.
L. P. F.
DC AMP
F. F ∠0° 19KHz
TUFF ∠90° 19KHz
TUFF 38KHz
VCO 76KHz
DECODER
POWER
8~12V
GND.
L
R
OUT PUT

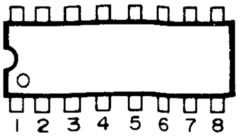
IC TOP VIEW


16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8

AM RF IF IC LA1240 SIGNAL FLOW


OSC COIL
IF FILTER (1)
IF FILTER (2)
Vcc=12V
INPUT
MW ANTENNA
RFA-2
RFA-1
CONV.
IFA-2
IFA-1
IFA-3
DET.
AGC DRIVE
SM DRIVE
SUB
OUTPUT
SIGNAL METER

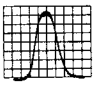
IC TOP VIEW


16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8

AM-FM MULTIPLEX ALIGNMENT

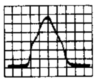
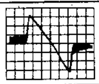
AM ALIGNMENT

For alignment: Maintain generator output as low as possible for suitable indication.

Step	Adjusting circuit	Connection		Position of Tuning dial	Adjustment	V.T.V.M. Oscilloscope
		Input	Output			
1	IF	Connect 455 kHz sweep generator to VC4.	Connect Oscilloscope to Test Point TP6.	Near max. capacity of VC at position of no interference	AM IFT 2-00040	
2	MW (RF)	Connect AM generator to EXT AM antenna and GND terminals. Set to 600 kHz. Modulate with 30 %, 400 Hz.	Connect Oscilloscope and AC. V.T.V.M. to Tuner Output.	600 kHz	AM BAR ANT 9-25240 MW OSC 9-20851	Max.
3		Change frequency to 1400 kHz.		1400 kHz	TC 01,03	
4	LW (RF)	Change frequency to 160 kHz.		160 kHz	LW OSC 9-20860	Max.
5		Change frequency to 350 kHz.		350 kHz	TC 02, 04	
6	Repeat adjustments.					

1. Variable capacitor completely closed
2. Set the dial pointer to very left line dial scale.
3. Connect sweep generator, SG, V.T.V.M. and oscilloscope.
4. Function switch to "MW" or "LW"
5. Use a screwdriver with plastic grip for all adjustments.

FM ALIGNMENT

Step	Adjusting circuit	Connection		Position of Tuning dial	Adjustment	V.T.V.M. Oscilloscope
		Input	Output			
1	IF	Connect sweep 10.7 MHz generator to test point VC2.	Connect Oscilloscope to Test Point TP4	Near max. capacity of VC. at position of no interference	FM IFT 9-21360	
2	Quadrature Detector		Connect Oscilloscope to Test Point TP3		FM QUADRATURE COIL 9-21320	
3	RF	Connect FM RF generator through two 120-ohm resistors to FM antenna screw terminals. Set generator to 90 MHz, modulate with 400 Hz to provide ±75 kHz deviation. Set generator output attenuator as low as possible.	Connect V.T.V.M. to Tuner Output.	90 MHz	FM ANT COIL 9-21180 FM RF COIL 9-20460 FM OSC COIL 9-20910	Max.
4		Change generator setting to 106 MHz.		106 MHz		Max.
5	Repeat adjustments.					

1. Variable capacitor completely closed
2. Set the dial pointer to very left line of dial scale.
3. Connect sweep generator, FM SG, V.T.V.M. and oscilloscope. FM ANT input impedance is 75 ohm.
4. Function switch to "FM"
5. Use a screwdriver with plastic grip for all adjustments.

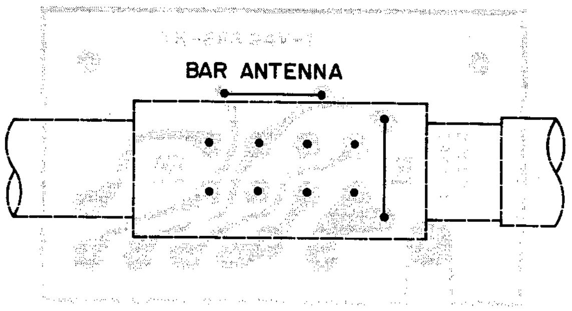
FM MPX ALIGNMENT

Step	Adjusting circuit	Connection		Position of Tuning dial	Adjustment	
		Input	Output			
1	PLL IC FO (19 kHz) Adjustmnet	None	Connect Frequency counter or synchroscope to TP5	Near max. capacity of VC. at position of no interference	Adjust VR04 (5k-B) so that frequency counter or synchroscope indicates 19 kHz.	
2	FM STEREO Signal Separation	As above Steps 3,4 except modulation. Modulate LEFT channel ±67.5 kHz – 400 Hz audio and ±7.5 kHz – 19 kHz pilot carrier. As above except modulate RIGHT Channel.	Connect V.T.V.M. to output terminal (R Channel) Connect V.T.V.M. to output terminal (L Channel).		VR05 (1k-B)	V.T.V.M. Min.
3	Repeat steps 1,2. Set at position with max. channel separation.					

1. Variable capacitor completely closed
2. Connect FM stereo SG and V.T.V.M.
3. Function switch to "FM"
4. Use a screwdriver with plastic grip for all adjustments.

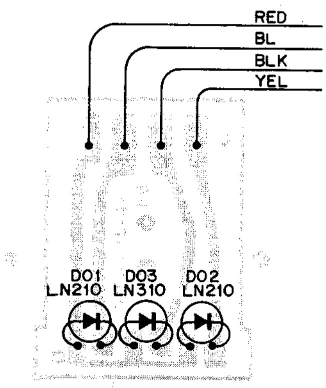
AM ANTENNA P.C.BOARD

(BOTTOM VIEW)


BAR ANTENNA

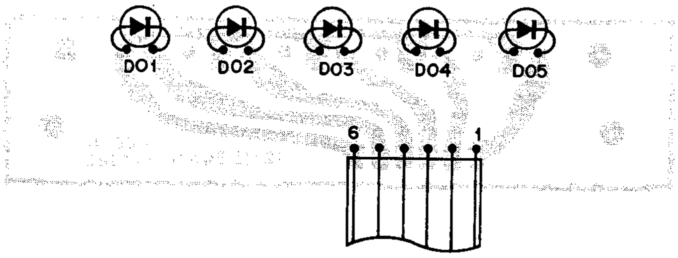
LED(POINTER) P.C.BOARD

(BOTTOM VIEW)


RED
BL
BLK
YEL
D01
LN210
D03
LN310
D02
LN210

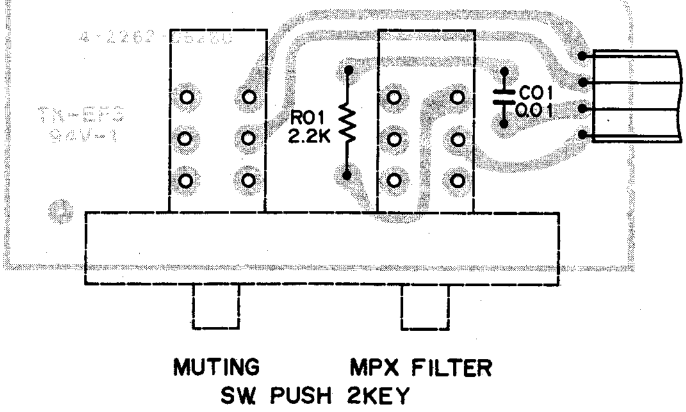
LED (SIGNAL) P.C.BOARD

(BOTTOM VIEW)


D01
D02
D03
D04
D05
6
1

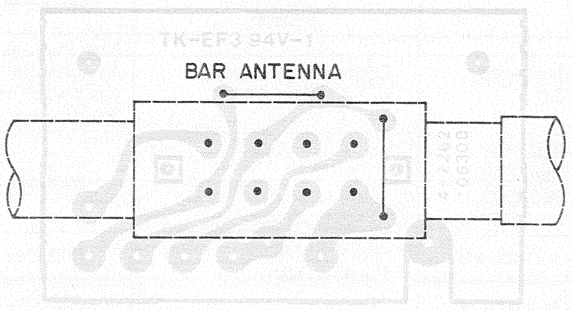
MUTING/MPX FILTER SW. P.C.BOARD

(BOTTOM VIEW)


4-2262
R01
2.2K
C01
0.01
MUTING
MPX FILTER
SW. PUSH 2KEY

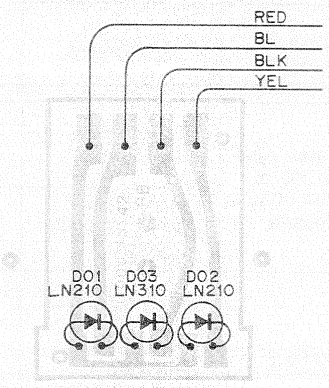
AM ANTENNA P.C.BOARD

(BOTTOM VIEW)


TK-EF3 94V-1
BAR ANTENNA
4-2262-06300

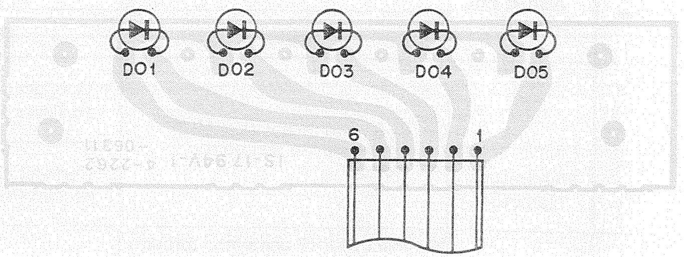
LED(POINTER) P.C.BOARD

(BOTTOM VIEW)


RED
BL
BLK
YEL
D01
LN210
D03
LN310
D02
LN210

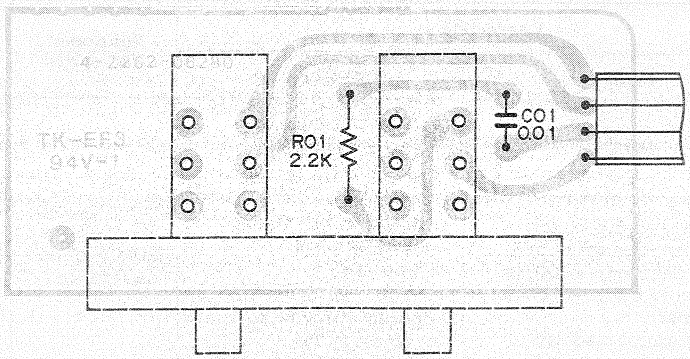
LED (SIGNAL) P.C.BOARD

(BOTTOM VIEW)


D01
D02
D03
D04
D05
6
1

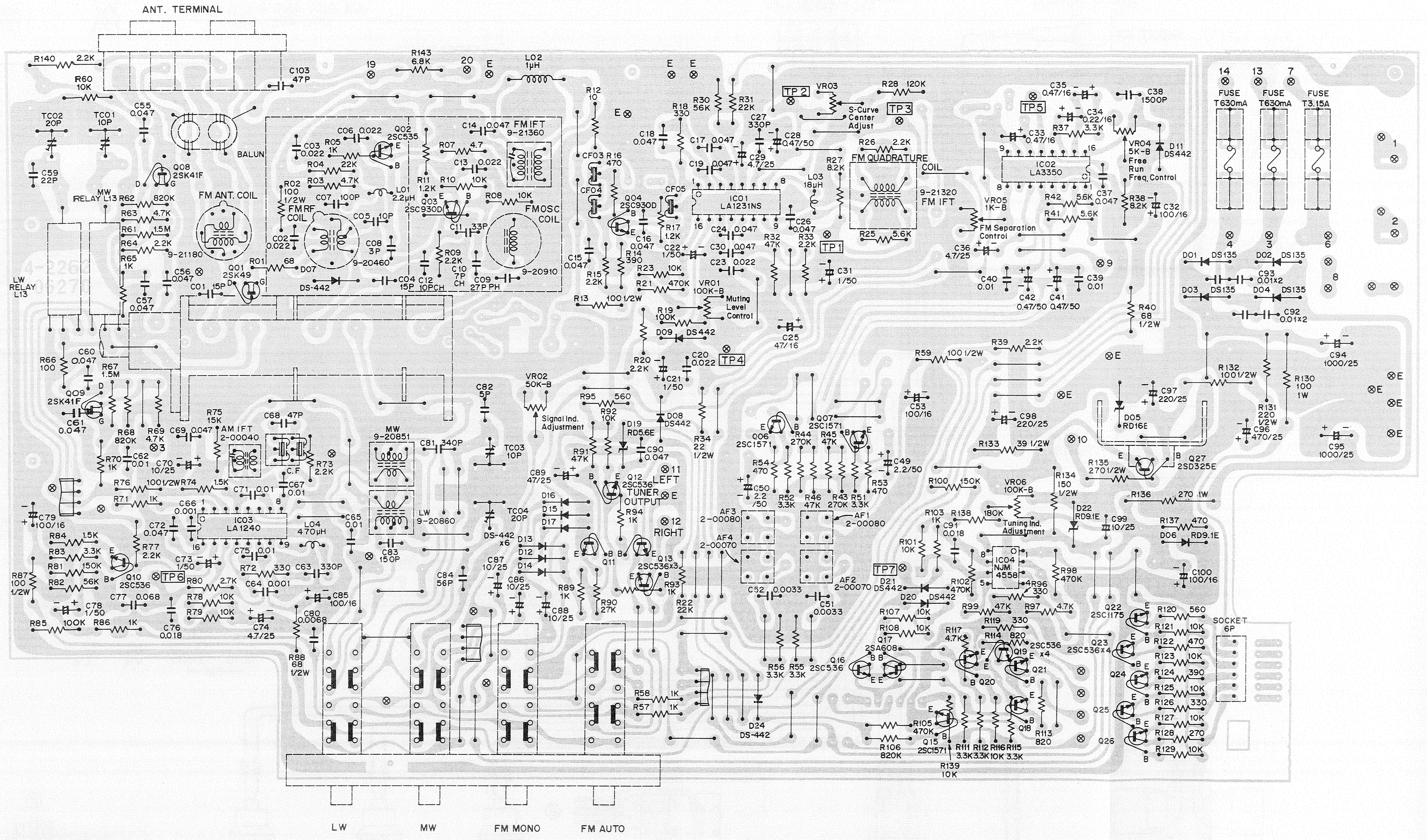
MUTING/MPX FILTER SW. P.C.BOARD

(BOTTOM VIEW)


4-2262-06280
TK-EF3
94V-1
R01
2.2K
C01
0.01
MUTING
MPX FILTER
SW. PUSH 2KEY

RF/IF, MPX, POWER SUPPLY P.C.BOARD

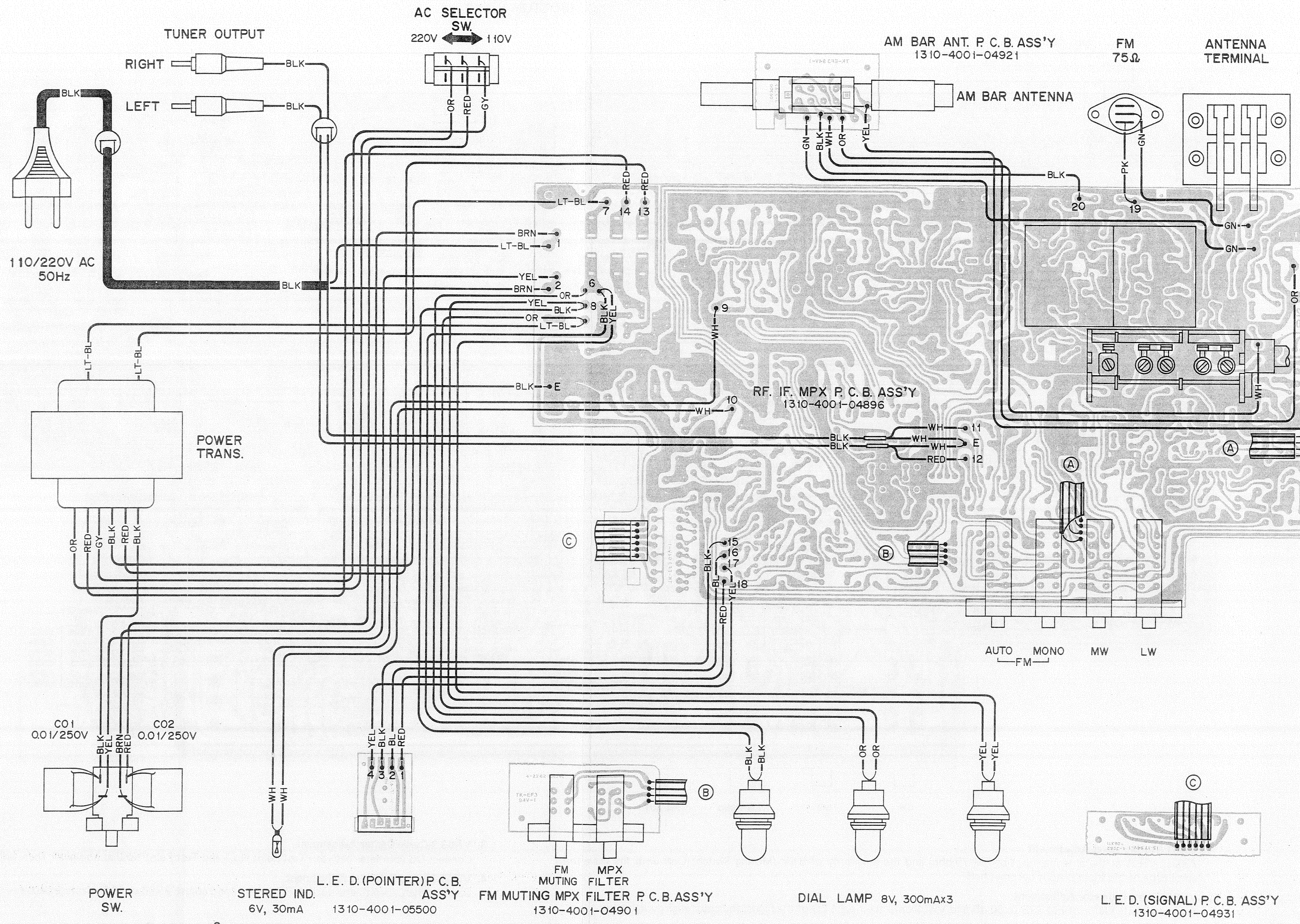
(BOTTOM VIEW)


ANT. TERMINAL
BALUN
FM ANT. COIL
MW RELAY L13
LW RELAY L13
FMRF COIL
FMOSC COIL
FM IFT 9-21360
9-21180
9-20460
9-20910
IC01 LA1231NS
FM QUADRATURE COIL
9-21320 FM IFT
IC02 LA3350
IC03 LA1240
IC04 NJM 4558
AM IFT 2-00040
MW 9-20851
LW 9-20860
VR01 100K-B Muting Level Control
VR02 50K-B Signal Ind. Adjustment
VR03 S-Curve Center Adjust
VR04 5K-B Free Run Freq. Control
VR05 1K-B FM Separation Control
VR06 100K-B Tuning Ind. Adjustment
TP1
TP2
TP3
TP4
TP5
TP6
TP7
LEFT TUNER OUTPUT
RIGHT
AF1 2-00080
AF2 2-00070
AF3 2-00080
AF4 2-00070
FUSE T630mA
FUSE T630mA
FUSE T3.15A
SOCKET 6P
LW
MW
FM MONO
FM AUTO

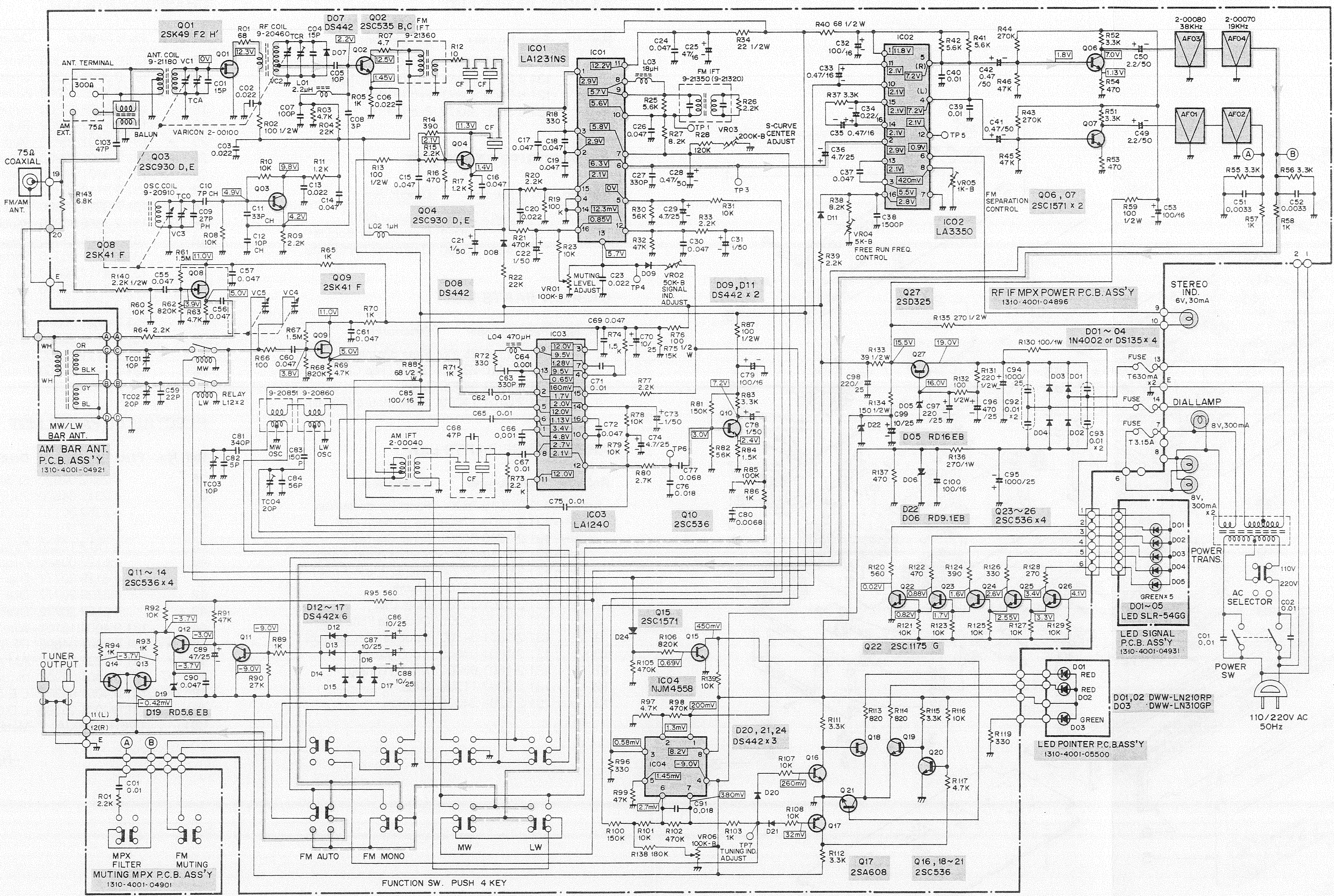
1. **VR01 Muting Level Adjustment**
   Adjust VR01 at the antenna input of FM 75 ohm and the sensitivity of 8 μV (Muting Switch: ON) until the wave form amplitude of the tuner output becomes half.
2. **VR02 Signal Indicator Adjustment**
   Adjust the attenuator of FM SSG to 60 dB and VR02 until the final LED of the Signal Indicator slightly lights up.

3. **VR03 S-Curve Center Adjustment**
   Connect DC voltmeter between Test Point No.1 and Test Point No.2 at no-signal. Then, adjust VR03 until 0 V is obtained.
4. **VR06 Tuning Indicator Adjustment**
   Connect the DC voltmeter to Test Point No. 7 and adjust VR06 until the voltage becomes 0±50 mV.

POINT TO POINT WIRING DIAGRAM


AC SELECTOR SW.
220V
110V
OR
RED
GY
TUNER OUTPUT
RIGHT
LEFT
BLK
110/220V AC 50Hz
AM BAR ANT. P. C. B. ASS'Y
1310-4001-04921
AM BAR ANTENNA
GN
BLK
WH
OR
YEL
FM 75Ω
PK
ANTENNA TERMINAL
RED
LT-BL
7
14
13
BRN
1
YEL
2
6
8
9
OR
LT-BL
E
10
WH
20
19
GN
RF. IF. MPX P. C. B. ASS'Y
1310-4001-04896
11
12
POWER TRANS.
A
B
C
15
16
17
18
BL
AUTO
MONO
FM
MW
LW
C01 0.01/250V
C02 0.01/250V
4
3
2
1
POWER SW.
STERED IND.
6V, 30mA
L. E. D. (POINTER) P. C. B. ASS'Y
1310-4001-05500
FM MUTING
MPX FILTER
FM MUTING MPX FILTER P. C. B. ASS'Y
1310-4001-04901
DIAL LAMP 8V, 300mA×3
L. E. D. (SIGNAL) P. C. B. ASS'Y
1310-4001-04931

SCHEMATIC DIAGRAM

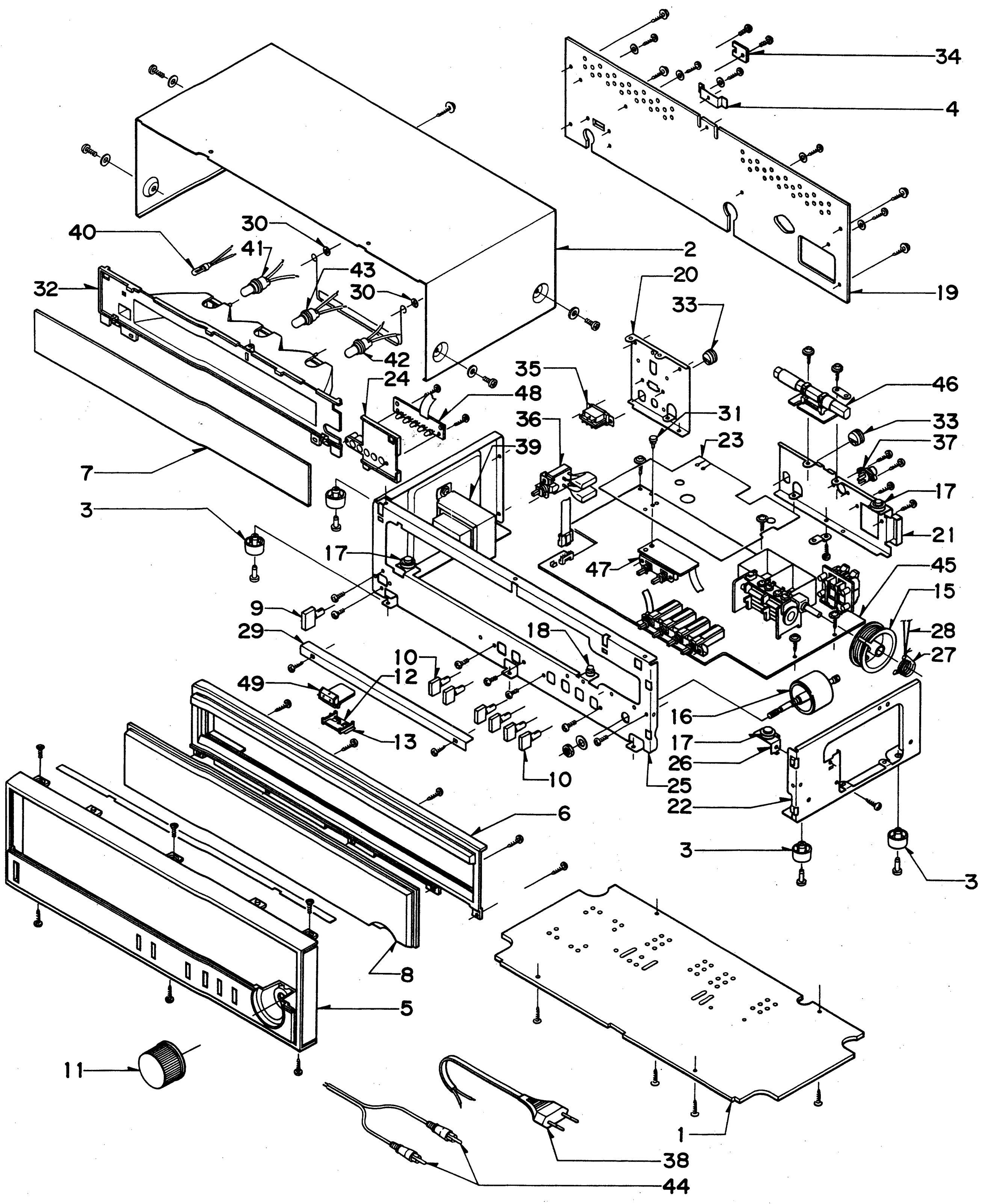


Q01 2SK49 F2 H'
D07 DS442
Q02 2SC535 B,C
FM IFT 9-21360
RF COIL 9-20460
ANT. COIL 9-21180
ANT. TERMINAL
300Ω
75Ω
AM EXT.
BALUN
VARICON 2-00100
75Ω COAXIAL
FM/AM ANT.
Q03 2SC930 D,E
OSC COIL 9-20910
Q08 2SK41 F
Q09 2SK41 F
Q04 2SC930 D,E
D08 DS442
IC01 LA1231NS
FM IFT 9-21350 (9-21320)
S-CURVE CENTER ADJUST
MUTING LEVEL ADJUST
VR02 50K-B SIGNAL IND. ADJUST
D09, D11 DS442 x 2
IC02 LA3350
FREE RUN FREQ. CONTROL
FM SEPARATION CONTROL
Q06, 07 2SC1571 x 2
2-00080 38KHz
2-00070 19KHz
RF IF MPX POWER P.C.B. ASS'Y 1310-4001-04896
Q27 2SD325
STEREO IND. 6V, 30mA
D01 ~ 04 1N4002 or DS135 x 4
FUSE T630mA x2
FUSE T3.15A
DIAL LAMP 8V, 300mA
D05 RD16EB
D22 D06 RD9.1EB
Q23~26 2SC536 x4
POWER TRANS.
AC SELECTOR
110V
220V
POWER SW
110/220V AC 50Hz
MW/LW BAR ANT.
AM BAR ANT. P.C.B. ASS'Y 1310-4001-04921
RELAY LW L12x2
MW OSC
LW OSC
AM IFT 2-00040
IC03 LA1240
Q10 2SC536
Q11 ~ 14 2SC536 x 4
D12 ~ 17 DS442 x 6
D19 RD5.6 EB
TUNER OUTPUT
Q15 2SC1571
IC04 NJM4558
D20, 21, 24 DS442 x 3
TP7 TUNING IND. ADJUST
Q17 2SA608
Q16, 18~21 2SC536
Q22 2SC1175 G
D01~05 LED SLR-54GG
GREEN x 5
LED SIGNAL P.C.B. ASS'Y 1310-4001-04931
D01, 02 DWW-LN210RP
D03 DWW-LN310GP
RED
GREEN
LED POINTER P.C.B. ASS'Y 1310-4001-05500
MPX FILTER
FM MUTING
MUTING MPX P.C.B. ASS'Y 1310-4001-04901
FM AUTO
FM MONO
MW
LW
FUNCTION SW. PUSH 4 KEY

NOTES:

1. All resistors values are indicated in "ohm" (K=10^3, M=10^6).
2. All capacitors values are indicated in "μF" (P=10^{-12}).
3. All voltages indicated on the schematics are measured under the following conditions.
   a. Use a V.T.V.M.
   b. All voltages ±10% with respect chassis ground
   c. No signals at input terminals
   d. AC input at 220 volts 50 Hz
4. This is a fundamental schematics diagram. Some products may be modified without notice.

EXPLODED VIEW OF CABINET AND CHASSIS



PARTS LIST

PACKING PARTS LIST

Ref. No.	Parts Number	Description
	131 6 1139 85602	Box Corrugate-EXP
	131 6 2119 02131	Bag Polyethylene-EXP
	131 6 3009 30371	Pad (Right)
	131 6 3009 30372	Pad (Left)

ACCESSORIES PARTS LIST

Ref. No.	Parts Number	Description
	4 2442 00030	Antenna FM
	131 6 4119 84902	Explanatory Booklet
	131 6 4519 15700	Guarantee Certificate

CABINET PARTS LIST

Ref. No.	Parts Number	Description
1	131 2 1105 25300	Plate Bottom
2	131 2 1410 23700	Cover (Top Cover)
3	131 2 1801 14600	Leg
4	131 2 3101 71200	Metal Mount (Cover)

APPEARANCE PARTS LIST

Ref. No.	Parts Number	Description
5	131 0 1016 36901	Panel Decorate Assy
	131 2 1202 17800	Escutcheon Dial
	131 2 1203 50601	Panel Control
	131 2 6113 37800	Shelter (Push Knob)
	131 2 6113 38900	Shelter (Push Knob)
6	131 2 1116 19101	Frame
7	131 2 1201 35901	Plate Dial
8	131 2 1205 24900	Decorate Plate Dial
9	131 2 1601 64500	Knob (Power Switch)
10	131 2 1601 64600	Knob (Push)
11	131 2 1601 66400	Knob (Tuning)
12	131 2 2307 11300	Slide
13 *	131 2 5205 24000	Cushion

CHASSIS PARTS LIST

Ref. No.	Parts Number	Description
15	131 0 3002 11300	Drum Assy
16	131 0 3003 21200	Shaft Dial Assy
17	131 0 3020 11000	Pulley Assy
18	131 0 3020 11800	Pulley Assy
19	131 2 1102 47209	Rear Cover
20 *	131 2 3101 70800	Metal Mount (AC Cord)
21 *	131 2 3101 70900	Metal Mount (Antenna)
22 *	131 2 3101 71100	Metal Mount (Panel Front)
23	131 2 3110 00300	Plate Pad Wire
24	131 2 3304 17600	Plate Dial Rear
25 *	131 2 3305 30000	Panel Front
26	131 2 4106 23400	Metal Mount Pulley
27	131 2 4111 00400	Spring Rope
28	131 2 4112 10400	Dial Rope
29	131 2 4120 13100	Slide Rail Pointer
30	131 2 4220 10502	Ring Snap
31	131 2 4221 00600	Rivet
32	131 2 6110 29301	Shelter Light
33	131 2 6111 14200	Bushing (Output & Line Cord)
34	131 2 7104 00500	Plate Pad Switch

ELECTRICAL PARTS LIST

Ref. No.	Parts Number	Description
35	4 2312 01020	Slide Switch
36	4 2312 04520	Push Switch Power
37	4 2352 00110	Socket 1P (FM AM Ant.)
38	4 2432 00140	Power Cord
39	4 2512 12320	Power Transformer
40	4 6122 00440	Pilot Lamp 6 V, 30 mA (Stereo)
41	4 6129 20771	Dial Lamp 8 V, 300 mA
42	4 6129 20777	Dial Lamp 8 V, 300 mA
43	4 6129 20779	Dial Lamp 8 V, 300 mA
44	131 0 4004 15101	Wire Shield Assy
45 *	131 0 4001 04896	RF/IF, MPX, Power P.C.B. Assy
46 *	131 0 4001 04921	AM Antenna P.C.B. Assy
47 *	131 0 4001 04901	Muting/MPX Filter P.C.B. Assy
48 *	131 0 4001 04931	L.E.D. (Signal) P.C.B. Assy
49 *	131 0 4001 05500	L.E.D. (Pointer) P.C.B. Assy
C01	C2EHRM103A	Metallized Paper 0.01 μF 250V ±20%

*—Not a service part.

PARTS LIST (Continued)

RF/IF, MPX, Power P .C.B. Assy
131 0 4001 04896

Ref. No.	Parts Number	Description
	4 2242 00100	Variable Capacitor
	4 2272 00020	Ceramic Filter 10.7 MHz
	4 2272 00030	Ceramic Filter 454.5 kHz
	4 2312 04330	Switch Push 4key
	4 2329 20210	Relay Leed
	4 2349 20400	Fuse T630 mA
	4 2349 20580	Fuse T3.15 A
	4 2352 00200	Fuse Clip
	4 2362 00370	Plug 6P
	4 2372 00770	Antenna Terminal
	4 2372 00830	CE Terminal 1P
	4 2522 00070	AF Filter MPX 19 kHz
	4 2522 00080	AF Filter MPX 38 kHz
	4 2562 00040	IF Transformer AM
	4 2569 21320	IF Transformer FM
	4 2569 21360	IF Transformer FM
	4 2579 21180	Antenna Coil FM
	4 2589 20851	OSC Coil MW
	4 2589 20860	OSC Coil LW
	4 2589 20910	OSC Coil FM
	4 2599 20300	Balun
	4 2599 20460	RF Coil FM
TC01	4 2249 20310	Trimmer Capacitor 10P
TC02	4 2249 20440	Trimmer Capacitor 20P
TC03	4 2249 20310	Trimmer Capacitor 10P
TC04	4 2249 20440	Trimmer Capacitor 20P
VR01	4 2222 00960	VR 100k-B (Muting Level)
VR02	4 2222 01010	VR 50k-B (Signal Ind. Adjust)
VR03	4 2222 01020	VR 200k-B (S-Curve Center Adjust)
VR04	4 2222 01000	VR 5k-B (Free Run Freq. Cont.)
VR05	4 2222 00990	VR 1k-B (FM Separation Cont.)
VR06	4 2222 00960	VR 100k-B (Tuning Ind. Adjust)
L01	4 2539 20420	Choke Coil 2.2 μH
L02	4 2539 20120	IF Trap 1 μH
L03	4 2532 00030	Choke Coil 18 μH
L04	4 2539 20410	Choke Coil 470 μH
	CAPACITORS	
C01	C1HCYK150APA	Ceramic 15 pF 50V ±10%
C02,03	C1HYYZ223APA	Ceramic 0.022 μF 50V +80,–20%
C04	C1HCYK150APA	Ceramic 15 pF 50V ±10%
C05	C1HCYD100APA	Ceramic 10 pF 50V ±0.5%
C06	C1HYYZ223APA	Ceramic 0.022 μF 50V +80,–20%
C07	C1HCYK101APA	Ceramic 100 pF 50V ±10%
C08	C1HCYC030APA	Ceramic 3 pF 50V ±0.25%
C09	C1HCDK270PH	Ceramic 27 pF 50V ±10%
C10	C1HCDD070CH	Ceramic 7 pF 50V ±0.5%
C11	C1HCDK330CH	Ceramic 33 pF 50V ±10%
C12	C1HCDD100CH	Ceramic 10 pF 50V ±0.5%
C13	C1HYYZ223APA	Ceramic 0.022 μF 50V +80,–20%
C14,15 16,17 18,19	C1HYYZ473APA	Ceramic 0.047 μF 50V +80,–20%
C20	C1HYYZ223APA	Ceramic 0.022 μF 50V +80,–20%
C21	C1HRY-105APA	Electrolytic 1 μF 50V
C22	C1HRE-105A	Electrolytic 1 μF 50V
C23	C1HYYZ223APA	Ceramic 0.022 μF 50V +80,–20%
C24	C1HYYZ473APA	Ceramic 0.047 μF 50V +80,–20%
C25	C1CRY-476APA	Electrolytic 47 μF 16V
	CAPACITORS	
C26	C1HYYZ473APA	Ceramic 0.047 μF 50V +80,–20%
C27	C1HCSK331SL	Ceramic 330 pF 50V ±10%
C28	C1HRY-474APA	Electrolytic 0.47 μF 50V
C29	C1ERE-475A	Electrolytic 4.7 μF 25V
C30	C1HYYZ473APA	Ceramic 0.047 μF 50V +80,–20%
C31	C1HRY-105APA	Electrolytic 1 μF 50V
C32	C1CRE-107A	Electrolytic 100 μF 16V
C33	C1CUBX474A	Sint. Alu. 0.47 μF 16V +40,–20%
C34	C1CUBX224A	Sint. Alu. 0.22 μF 16V +40,–20%
C35	C1CUBX474A	Sint. Alu. 0.47 μF 16V +40,–20%
C36	C1ERY-475APA	Electrolytic 4.7 μF 25V
C37	C1HFYK473APA	Mylar 0.047 μF 50V ±10%
C38	C1HSEJ152A	Styrol 1500 pF 50V ±5%
C39,40	C1HFRM103A	Mylar 0.01 μF 50V ±20%
C41,42	C1HRY-474LPA	Electrolytic 0.47 μF 50V
C49,50	C1HRY-225LPA	Electrolytic 2.2 μF 50V
C51,52	C1HFYK332APA	Mylar 0.0033 μF 50V ±10%
C53	C1CRE-107A	Electrolytic 100 μF 16V
C55,56 57	C1HYYZ473APA	Ceramic 0.047 μF 50V +80,–20%
C59	C1HCYK220APA	Ceramic 22 pF 50V ±10%
C60,61	C1HYYZ473APA	Ceramic 0.047 μF 50V +80,–20%
C62	C1HFYK103APA	Mylar 0.01 μF 50V ±10%
C63	C1HCYK331APA	Ceramic 330 pF 50V ±10%
C64	C1HYYZ102APA	Ceramic 0.001 μF 50V +80,–20%
C65	C1HFYK103APA	Mylar 0.01 μF 50V ±10%
C66	C1HYYZ102APA	Ceramic 0.001 μF 50V +80,–20%
C67	C1HFYK103APA	Mylar 0.01 μF 50V ±10%
C68	C1HCYK470APA	Ceramic 47 pF 50V ±10%
C69	C1HYYZ473APA	Ceramic 0.047 μF 50V +80,–20%
C70	C1ERY-106APA	Electrolytic 10 μF 25V
C71	C1HFRM103A	Mylar 0.01 μF 50V ±20%
C72	C1HYYZ473APA	Ceramic 0.047 μF 50V +80,–20%
C73	C1HRY-105APA	Electrolytic 1 μF 50V
C74	C1ERY-475APA	Electrolytic 4.7 μF 25V
C75	C1HFYK103APA	Mylar 0.01 μF 50V ±10%
C76	C1HFYK183APA	Mylar 0.018 μF 50V ±10%
C77	C1HFRM683A	Mylar 0.068 μF 50V ±20%
C78	C1HRY-105APA	Electrolytic 1 μF 50V
C79	C1CRE-107A	Electrolytic 100 μF 16V
C80	C1HFYK682APA	Mylar 0.0068 μF 50V ±10%
C81	C1HSEJ341A	Styrol 340 pF 50V ±5%
C82	C1HCYC050APA	Ceramic 5 pF 50V ±0.25%
C83	C1HSEJ151A	Styrol 150 pF 50V ±5%
C84	C1HCYK560APA	Ceramic 56 pF 50V ±10%
C85	C1CRE-107A	Electrolytic 100 μF 16V
C86,87 88	C1ERY-106APA	Electrolytic 10 μF 25V
C89	C1ERE-476A	Electrolytic 47 μF 25V
C90	C1HYYZ473APA	Ceramic 0.047 μF 50V +80,–20%
C91	C1HFYK183APA	Mylar 0.018 μF 50V ±10%
C92,93	4 2232 00430	Ceramic 0.01 μFx2 250V
C94,95	C1ERE-108A	Electrolytic 1000 μF 25V
C96	C1ERE-477A	Electrolytic 470 μF 25V
C97,98	C1ERE-227A	Electrolytic 220 μF 25V
C99	C1ERY-106APA	Electrolytic 10 μF 25V
C100	C1CRE-107A	Electrolytic 100 μF 16V
C103	C1HCYK470APA	Ceramic 47 pF 50V ±10%

PARTS LIST (Continued)

Ref. No.	Parts Number	Description
	SEMICONDUCTORS	
D01,02 03,04	DGG-1N4002	Diode, 1N4002 or DS-135
D05	DNN-RD16E	Zenner Diode, RD16E
D06	DNN-RD9.1E	Diode, RD9.1E
D07,08 09,11 12,13 14,15 16,17	205 5 9040 44210	Diode, DS-442
D19	DNN-RD5.6E	Zener Diode, RD5.6E
D20,21	205 5 9040 44210	Diode, DS-442
D22	DNN-RD9.1E	Diode, RD9.1E
D24	205 5 9040 44210	Diode, DS-442
IC01	206 5 0161 23151	IC, LA1231NS
IC02	206 5 0743 35012	IC, LA3350
IC03	206 5 0171 24010	IC, LA1240
IC04	IJJ-NJM4558DX	IC, NJM4558D
Q01	TNN-2SK49--F2	TR 2SK49 F2
Q02	TKK-2SC535--B	TR 2SC535 B, C
Q03,04	203 5 5500 93040	TR 2SC930 D, E
Q06,07	203 5 5251 57160	TR 2SC1571 F, G
Q08,09	203 5 6510 04160	TR 2SK41 F
Q10,11 12,13 14	203 5 5000 53660	TR 2SC536 F, G
Q15	203 5 5251 57180	TR 2SC1571 H
Q16	203 5 5000 53660	TR 2SC536 F, G
Q17	203 5 7230 60860	TR 2SA608 F, G
Q18,19 20,21	203 5 5000 53660	TR 2SC536 F, G
Q22	203 5 6711 17570	TR 2SC1175 G
Q23,24 25,26	203 5 5000 53660	TR 2SC536 F, G
Q27	203 5 8620 32550	TR 2SD325 E, F
	RESISTORS	
R01	R2EDZJ680APA	Carbon 68 1/4W ±5%
R02	R2HXBJ101A	Oxide Metal Film 100 1/2W ±5%
R03	R2EDZJ472APA	Carbon 4.7k 1/4W ±5%
R04	R2EDZJ223APA	Carbon 22k 1/4W ±5%
R05	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R07	R2EDZJ4R7APA	Carbon 4.7 1/4W ±5%
R08	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R09	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%
R10	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R11	R2EDZJ122APA	Carbon 1.2k 1/4W ±5%
R12	R2EDZJ100APA	Carbon 10 1/4W ±5%
R13	R2HXBJ101A	Oxide Metal Film 100 1/2W ±5%
R14	R2EDZJ391APA	Carbon 390 1/4W ±5%
R15	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%
R16	R2EDZJ471APA	Carbon 470 1/4W ±5%
R17	R2EDZJ122APA	Carbon 1.2k 1/4W ±5%
R18	R2EDZJ331APA	Carbon 330 1/4W ±5%
R19	R2EDZJ104APA	Carbon 100k 1/4W ±5%
R20	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%
R21	R2EDZJ474APA	Carbon 470k 1/4W ±5%
R22	R2EDZJ223APA	Carbon 22k 1/4W ±5%
R23	R2EDZJ103APA	Carbon 10k 1/4W ±5%
	RESISTORS	
R25	R2EDZJ562APA	Carbon 5.6k 1/4W ±5%
R26	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%
R27	R2EDZJ822APA	Carbon 8.2k 1/4W ±5%
R28	R2EDZJ124APA	Carbon 120k 1/4W ±5%
R30	R2EDZJ563APA	Carbon 56k 1/4W ±5%
R31	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R32	R2EDZJ473APA	Carbon 47k 1/4W ±5%
R33	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%
R34	R2HXBJ220A	Oxide Metal Film 22 1/2W ±5%
R37	R2EDZJ332APA	Carbon 3.3k 1/4W ±5%
R38	R2EDZJ822APA	Carbon 8.2k 1/4W ±5%
R39	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%
R40	R2HXBJ680A	Oxide Metal Film 68 1/2W ±5%
R41,42	R2EDZJ562APA	Carbon 5.6k 1/4W ±5%
R43,44	R2EDZJ274APA	Carbon 270k 1/4W ±5%
R45,46	R2EDZJ473APA	Carbon 47k 1/4W ±5%
R51,52	R2EDZJ332APA	Carbon 3.3k 1/4W ±5%
R53,54	R2EDZJ471APA	Carbon 470 1/4W ±5%
R55,56	R2EDZJ332APA	Carbon 3.3k 1/4W ±5%
R57,58	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R59	R2HXBJ101A	Oxide Metal Film 100 1/2W ±5%
R60	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R61	R2EDZJ155APA	Carbon 1.5M 1/4W ±5%
R62	R2EDZJ824APA	Carbon 820k 1/4W ±5%
R63	R2EDZJ472APA	Carbon 4.7k 1/4W ±5%
R64	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%
R65	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R66	R2EDZJ101APA	Carbon 100 1/4W ±5%
R67	R2EDZJ155APA	Carbon 1.5M 1/4W ±5%
R68	R2EDZJ824APA	Carbon 820k 1/4W ±5%
R69	R2EDZJ472APA	Carbon 4.7k 1/4W ±5%
R70,71	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R72	R2EDZJ331APA	Carbon 330 1/4W ±5%
R73	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%
R74	R2EDZJ152APA	Carbon 1.5k 1/4W ±5%
R75	R2EDZJ153APA	Carbon 15k 1/4W ±5%
R76	R2HXBJ101A	Oxide Metal Film 100 1/2W ±5%
R77	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%
R78,79	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R80	R2EDZJ272APA	Carbon 2.7k 1/4W ±5%
R81	R2EDZJ154APA	Carbon 150k 1/4W ±5%
R82	R2EDZJ563APA	Carbon 56k 1/4W ±5%
R83	R2EDZJ332APA	Carbon 3.3k 1/4W ±5%
R84	R2EDZJ152APA	Carbon 1.5k 1/4W ±5%
R85	R2EDZJ104APA	Carbon 100k 1/4W ±5%
R86	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R87	R2HXBJ101A	Oxide Metal Film 100 1/2W ±5%
R88	R2HXBJ680A	Oxide Metal Film 68 1/2W ±5%
R89	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R90	R2EDZJ273APA	Carbon 27k 1/4W ±5%
R91	R2EDZJ473APA	Carbon 47k 1/4W ±5%
R92	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R93,94	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R95	R2EDZJ561APA	Carbon 560 1/4W ±5%
R96	R2EDZJ331APA	Carbon 330 1/4W ±5%
R97	R2EDZJ472APA	Carbon 4.7k 1/4W ±5%
R98	R2EDZJ474APA	Carbon 470k 1/4W ±5%
R99	R2EDZJ473APA	Carbon 47k 1/4W ±5%

PARTS LIST (Continued)

Ref. No.	Parts Number	Description
	RESISTORS	
R100	R2EDZJ154APA	Carbon 150k 1/4W ±5%
R101	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R102	R2EDZJ474APA	Carbon 470k 1/4W ±5%
R103	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R105	R2EDZJ474APA	Carbon 470k 1/4W ±5%
R106	R2EDZJ824APA	Carbon 820k 1/4W ±5%
R107,108	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R111,112	R2EDZJ332APA	Carbon 3.3k 1/4W ±5%
R113,114	R2EDZJ821APA	Carbon 820 1/4W ±5%
R115	R2EDZJ332APA	Carbon 3.3k 1/4W ±5%
R116	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R117	R2EDZJ472APA	Carbon 4.7k 1/4W ±5%
R119	R2EDZJ331APA	Carbon 330 1/4W ±5%
R120	R2EDZJ561APA	Carbon 560 1/4W ±5%
R121	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R122	R2EDZJ471APA	Carbon 470 1/4W ±5%
R123	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R124	R2EDZJ391APA	Carbon 390 1/4W ±5%
R125	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R126	R2EDZJ331APA	Carbon 330 1/4W ±5%
R127	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R128	R2EDZJ271APA	Carbon 270 1/4W ±5%
R129	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R130	R3AXBJ101A	Oxide Metal Film 100 1W ±5%
R131	R2HXBJ221A	Oxide Metal Film 220 1/2W ±5%
R132	R2HXBJ101A	Oxide Metal Film 100 1/2W ±5%
R133	R2HZPK390A	Fuse 39 1/2W ±10%
R134	R2HXBJ151A	Oxide Metal Film 150 1/2W ±5%
R135	R2HXBJ271A	Oxide Metal Film 270 1/2W ±5%
R136	R3AXBJ271A	Oxide Metal Film 270 1W ±5%
R137	R2EDZJ471APA	Carbon 470 1/4W ±5%
R138	R2EDZJ184APA	Carbon 180k 1/4W ±5%
R139	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R140	R2HCPK222A	Solid 2.2k 1/2W ±10%
R143	R2EDZJ682APA	Carbon 6.8k 1/4W ±5%

AM ANTENNA P.C.B. Assy
131 0 4001 04921

Ref. No.	Parts Number	Description
	4 2579 25240	Bar Antenna AM

MUTING, MPX FILTER P.C.B. Assy
131 0 4001 04901

Ref. No.	Parts Number	Description
	4 2312 04550	Switch Push 2key
	CAPACITORS	
C01	C1HFYK103APA	Mylar 0.01 μF 50V ±10%
	RESISTORS	
R01	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%

L.E.D. (SIGNAL) P.C.B. Assy
131 0 4001 04931

Ref. No.	Parts Number	Description
	131 0 4006 22241	Cord Assy
	SEMICONDUCTORS	
D01,02 03,04 05	DYY-SLR-54GG	L.E.D. SLR-54GG (Green)

L.E.D. (POINTER) P.C.B. Assy
131 0 4001 05500

Ref. No.	Parts Number	Description
	131 0 3011 19400	Pointer Assy
	131 2 1110 28800	Plate Decorate
	131 2 3701 28000	Mount Electric Part
	131 0 4006 24201	Cord Assy
	SEMICONDUCTORS	
D01,02	DWW-LN210RP	L.E.D. LN210RP (Red)
D03	DWW-LN310GP	L.E.D. LN310GP (Green)

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